ASSIGNMENT 5

Textbook Assignment: "Atmospheric Phenomena" (continued); "Climatology and World Weather." Chapters 5 and 6, Pages 5-6 through 6-6.

5-1. Which of the following facts about fog is incorrect?

1. Fog is most easily described as a cloud at the Earth's surface
2. All fogs are composed of minute water particles only
3. Fog depth and density are quite variable
4. Local geography and topography can play a major role in the formation and dissipation of fog

5-2. Where and when is the formation of radiation fog most common?

1. Over cold waters at night
2. Over land at night
3. Over land in the early afternoon
4. Over coastal waters in the early morning

5-3. How does wind speed affect radiation fog?

1. Calm winds cause a shallow fog layer to form
2. Winds of 5 to 10 knots create turbulent currents that increase the depth of the fog
3. Winds greater than 10 knots usually cause the fog to lift, thereby forming low scud, stratus, or stratocumulus
4. All of the above

5-4. Which of the following conditions is most conducive to the formation of radiation fog?

1. Low pressure, light winds, and overcast skies
2. Low pressure, light winds, and clear skies
3. High pressure, light winds, and clear skies
4. High pressure, light winds, and overcast skies

5-5. What are advection fogs?

1. Fogs produced by the movement of warm air over a colder land or water surface
2. Fogs that form in the clear night air over warm waters
3. Fogs produced across air mass frontal boundaries
4. Fogs of the tropics

5-6. Which of the following types of fog is not classified as advection fog?

1. Sea fog
2. Arctic sea smoke
3. Upslope fog
4. Steam fog

5-7. Most fog is destroyed (lifted) when the wind speed over a fog enshrouded area increases. Which of the following classifications/types of fog is most likely to persist in wind up to 26 knots?

1. Land advection fog
2. Sea fog
3. Upslope fog
4. Radiation fog

5-8. Which of the following classifications/types of fog is most likely to occur in winter, when an arctic outbreak pushes off the U.S. east coast over warm Gulf Stream waters?

1. Sea fog
2. Steam fog
3. Land advection fog
4. Radiation fog

5-9. Which of the following statements concerning frontal fog is correct?

1. Frontal fog is the result of evaporation of falling rain
2. It forms in the cold air mass
3. This fog begins as low clouds that eventually lower to the ground
4. Each of the above

5-10. On some mornings, grass, plants, and possibly your car will be wet with dew while the road and some large objects will be dry. Why do some surfaces remain dry?

1. Micro air temperature differences
2. Micro dew point variations
3. Some surfaces retain heat longer and fail to cool to the dew point
4. Some surfaces cool far too fast for the moisture to accumulate on them

5-11. With regard to classification, how does spray differ from blowing spray?

1. Wind speed
2. Visibility
3. Wave heights
4. Droplet size

5-12. Tornadoes travel at what average range of speed?

1. 0 to 5 knots
2. 7 to 15 knots
3. 12 to 20 knots
4. 22 to 34 knots

5-13. Which of the following areas is most conducive for the formation of tornadoes?

1. Cols
2. 30 miles to the rear of short-wave troughs
3. 75 to 180 miles in advance of fast-moving cold fronts
4. In areas of warm air overrunning cold air

5-14. Which of the following conditions is NOT indicative of tornado formation?

1. Strong convergent winds at the surface
2. Suppressed convection up to the minus 10°C isotherm
3. Marked convective instability
4. Strong horizontal wind shear

5-15. Upon observing the development of a water-spout, how can an observer tell, if it is of the local or tornadic variety?

1. Size
2. Stability index
3. Development process
4. Vertical extent of convective clouds

5-16. Which of the following lithometeors reduce(s) visibility in a veil-like cover?

1. Smoke
2. Dust storms
3. Haze
4. Sand storms

5-17. Your station's visibility markers are set at 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2, 2 1/2, 3, 4, 5, 6, 7, and 15 miles. What is the maximum distance (by marker) that your observer will be able to see in a severe dust storm?

1. 1/8 mi
2. 1/4 mi
3. 3/8 mi
4. 1/2 mi

5-18. Which of the following statements is NOT a characteristic of photometeors?

1. They appear as luminous patterns in the sky
2. Many are cloud related
3. They help in describing the state of the atmosphere
4. They are all precursors of bad weather

5-19. When light encounters any substance, which of the following occurrences might take place?

1. Refraction only
2. Reflection or refraction
3. Absorption or refraction
4. Absorption, reflection, or refraction

5-20. Visible light occupies that portion of the electromagnetic spectrum between

1. 4000 and 7000 angstroms
2. 2500 and 4000 angstroms
3. 1200 and 2500 angstroms
4. 400 and 1100 angstroms

5-21. How does the Moon produce moonlight?

1. It is a luminous body and produces its own light
2. It absorbs light from the Sun and regenerates it at night
3. It reflects the light it receives from the Sun
4. Through a combination of reflection, absorption, and refraction

5-22. A substance permits the passage of light through it, but the light appears clouded, and viewing things through such a substance is impaired. This substance is described as being

1. transparent
2. translucent
3. opaque
4. fluorescent

5-23. An object that allows virtually 100 percent of the light striking it to pass through exhibits the property of

1. opacity
2. translucency
3. transparency
4. absorptivity

5-24. When none of the light waves that strike a medium pass through it, the medium is termed

1. opaque
2. absorbent
3. translucent
4. transparent

5-25. A ray of light striking a mirror perpendicularly is referred to as the

1. angle of reflection
2. angle of refraction
3. normal
4. reflected light

5-26. What is the term given to the angle between a reflected light ray and a perpendicular light ray?

1. Angle of incidence
2. Angle of reflection
3. Angle of refraction
4. The normal angle

5-27. When light passes through a medium that changes the direction of the light, the light is being

1. refracted only
2. reflected only
3. reflected or refracted
4. absorbed and reflected

5-28. When a light ray passes from one medium into another of greater density at an angle of 45 degrees, how is the light ray affected?

1. It slows and bends away from the normal
2. It slows and bends toward the normal
3. It is reflected at a 45-degree angle
4. It slows, but its path is not altered

5-29. What are the six distinct colors of the visible spectrum?

1. Red, orange, yellow, green, blue, and brown
2. Yellow, green, blue, orange, violet, and red
3. Blue, green, yellow, orange, black, and white
4. White, black, gray, yellow, blue, and red

5-30. Halos are almost exclusively associated with which of the following cloud forms?

1. Cumuliform
2. Stratiform
3. Cirriform

5-31. Which of the following differences distinguishes coronas from halos?

1. Coronas are usually much larger than halos
2. The outer ring of a corona is red, while a halo's is violet
3. Coronas are formed by refraction of light through ice crystals, while halos are caused by the diffraction of light by water droplets
4. Coronas form around the Sun and Moon while halos form only around the Sun

5-32. What color is usually seen on the outer arc of a rainbow?

1. Blue
2. Red
3. Yellow
4. Green

5-33. Mirages are produced when light is

1. absorbed in a very dense cold air mass
2. reflected off a very hot surface such as a desert
3. refracted when passing through layers of air with highly different densities
4. reflected, refracted, and diffracted in hot air

5-34. What is the term given to the phenomena that causes stars near the horizon to twinkle and change color?

1. Iridescence
2. Looming
3. Superior mirage
4. Scintillation

5-35. What is “looming”?

1. An atmospheric phenomenon that causes objects over the horizon, which would otherwise not be seen, to become visible
2. A phenomenon that causes stars to twinkle and change color near the horizon
3. An inferior mirage
4. A form of iridescence

5-36. A luminous beam of sunlight passing through a break in the clouds and extending to the Earth like a spotlight is known as

1. iridescence
2. scintillation
3. a crepuscular ray
4. a sunstroke

5-37. Which of the following atmospheric conditions is necessary for the formation of thunderstorms?

1. High temperatures and contrasting air masses
2. Conditionally stable air and high humidity
3. Moist, conditionally unstable air and a lifting mechanism
4. A weak horizontal temperature gradient, low-level turbulence, and high humidity

5-38. Which of the following statements is NOT true concerning the makeup of thunderstorms?

1. In the initial stages of development updrafts prevail throughout the cell
2. A cell’s life cycle usually lasts 1 to 3 hours
3. There are three distinct stages in the life cycle of a cell
4. They consists of only one convective cell

5-39. Which of the following lapse rates would most likely NOT be found in a thunderstorm?

1. .45/100 meters
2. .75/100 meters
3. 7.0/1000 meters
4. 7.5/1000 meters

5-40. What is considered to be the most hazardous level for flying in a thunderstorm?

1. The base
2. The middle level
3. The upper level
4. The freezing level

5-41. Which of the following statements concerning the winds associated with thunderstorms is correct?

1. Microbursts, macrobursts, and first gusts occur in all convective cells
2. Microbursts are produced by violent updrafts
3. The wind speed of the first gust is usually the highest recorded in a storm
4. Macrobursts normally last 2 to 3 hours

5-42. What is the Earth’s normal electrical field?

1. Ground negative and air positive
2. Ground positive and air negative
3. Ground and air both positive
4. Ground and air both negative

5-43. Within a thunderstorm cloud, where is lightning most frequently encountered?

1. Several thousand feet below the freezing level
2. At the freezing level
3. Between the freezing level and 15°F
4. Between the freezing level and the base of the cloud

5-44. Auroras most commonly occur

1. in thunderstorms
2. near the Earth’s magnetic poles
3. when rarefied gases invade the lower atmosphere
4. near the equator

5-45. Which of the following factors distinguishes airglow from an aurora?

1. Airglow is fainter
2. Airglow does not shimmer as much as an aurora
3. Airglow appears in middle and lower altitudes, while auroras are a feature of high altitudes
4. Each of the above

5-46. Which of the following definitions best describes climate?

1. The scientific study of the weather of a region
2. The sum total of the Earth’s atmospheric variables
3. The average state of the Earth’s atmosphere over any given location over a long period of time
4. The general weather of a region

5-47. Which approach to climatology provides the most useful information to Aerographer's Mates in their travels around the world?

1. Physical climatology
2. Descriptive climatology
3. Dynamic climatology
4. Mesoclimatology

5-48. Which of the following types of climatic studies is usually likely be used to position runways for a new naval air station?

1. Microclimatology
2. Mesoclimatology
3. Macroclimatology
4. Physical climatology

5-49. Of the following climatic elements, which is considered to be the most important?

1. Pressure
2. Temperature
3. Wind
4. Precipitation

5-50. Moisture modifies temperature, while, at the same time, it is also influenced by temperature.

1. True
2. False

5-51. In most countries of the world, the amount of precipitation in climatic studies is expressed in what increments?

1. Inches
2. Centimeters
3. Millimeters
4. Centiliters

5-52. What are resultant winds?

1. The wind directions and speeds for a given level in the atmosphere
2. The vectorial average of all wind directions and speeds for a given period of time
3. The vectorial average of all wind directions and speeds for a given period of time, at a specific place
4. The wind directions and speeds for a specific place

5-53. Which of the following climatic terms is being determined when the highest and lowest temperatures of the day are added together and divided by 2?

1. Mean
2. Mode
3. Median
4. Normal

5-54. The extreme lowest temperature ever recorded at your station is -22°F. Which of the following climatic terms applies to this temperature?

1. Extreme low
2. Absolute low
3. Absolute minimum
4. Extreme absolute minimum

5-55. What temperature is normally used as the standard base temperature in computing heating degree days?

1. 85°F
2. 75°F
3. 65°F
4. 60°F

5-56. On the first day of your local power company's heating season, five heating degree days are measured. What does this number represent?

1. The number of kilowatts of energy used above the average number required to cool to a standard temperature
2. The difference between the first day's mean temperature and a temperature standard
3. An index of required energy
4. Standard deviation

5-57. Which of the following statements is correct with regard to average and standard deviation?

1. (+ or -) signs are critical in these computations
2. Average deviations use arithmetic averages of data, while standard deviations use actual measurements
3. A standard deviation is the square root of an average of squared mean deviations

IN ANSWERING QUESTIONS 5-58 THROUGH 5-65, USE THE FOLLOWING MONTHLY INFORMATION. (HIGHS AND LOWS ARE DEGREES FAHRENHEIT).

January	High	Low	February	High	Low
1	41	21	15	27	11
2	39	21	16	25	09
3	39	19	17	25	10
4	29	15	18	26	11
5	27	12	19	18	05
6	30	13	20	16	03
7	32	15	21	16	04
8	37	19	22	17	08
9	37	21	23	19	13
10	40	23	24	23	14
11	40	26	25	26	16
12	41	27	26	29	18
13	39	19	27	32	21
14	37	16	28	33	22

5-58. What is the mean high temperature (rounded off) for the month?

1. 37°
2. 32°
3. 30°
4. 26°

5-59. What is the range of the high temperatures?

1. 24° to 26°
2. 41° to 29°
3. 30°
4. 25°

5-60. What is the extreme mean monthly temperature?

1. 15°
2. 22°
3. 31°
4. 32°

5-61. What is the mode of the low temperatures?

1. 15°
2. 19°
3. 21°
4. 27°

5-62. What are the medians of the high and low temperatures?

1. 29.0 and 15.0°
2. 29.5 and 15.5°
3. 30.0 and 15.5°
4. 32.0 and 16.0°

5-63. When you use 41°F as the standard, what is the number of degree days for the first seven days of the month?

1. 71
2. 86
3. 109
4. 133

5-64. What is the average daily temperature deviation?

1. 6°
2. 7°
3. 8°
4. 9°

5-65. What is the standard deviation (rounded off) of the temperature for the month?

1. 6°
2. 7°
3. 8°
4. 9°